

Amphenol HD38999 High Density

Goes from 9 to 187 contacts!

The HD38999 family of connectors has 30% more contact density than the highest density Mil Spec 38999 connectors of its size. This series of connectors was designed to utilize mil-specified 38999 components with the exception of the contacts and inserts arrangement. Utilizing existing mil-qualified 39029 size 23 contacts and 38999 insert materials, these connectors are essentially a drop-in replacement for the standard 38999 connector.

This connector design benefits users in a couple of different ways. For those users who need to increase the amount of contacts in their application, the HD38999 series allows them to do so without increasing the size of their connector.

For users who are looking to decrease the overall size of their system, they can do so by using smaller shell sizes without decreasing the number of contacts.

Amphenol has qualified this series of connectors to the requirements of MIL -DTL-38999. Amphenol also manufactures this high density series in Filter, Hermetic and customized versions to fit our customers' needs. Please contact us if additional information is required.



HD38999 Connectors available styles:

- Aluminum
- Composite
- Stainless Steel
- Sealed (IP67)
- Filtered



For more information e-mail:

hd38999info@amphenol-aao.com

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MIL-DTL-38999 Series III Typical Markets:

- Military & Commercial Aviation
- Military Vehicles
- C4ISR

Amphenol
Aerospace

Easy Steps to build a part number... HD38999

1.	2.	3.	4.	5.	6.	7.
Connector Type	Shell Styles	Service Class	Shell Size – Insert Arrangement	Contact Type	Alternate Positions	PCB Options
HDTV or HDPTV(Potted version)	06	RW	23-151	P	B	(P25)



Step 1. Select a Connector Type

	Designates
P (prefix for Potted)	HDTV Tri-Start Series Connector
	HDPTV Back panel mounted receptacle
	HDMTV CLUTCH-LOK high vibration plug connector (Note: remove dashes in how to order part number when ordering CLUTCH-LOK)
	HDCTV Tri-Start Composite Series connector
	HDCTVP Panel mounted composite receptacle

Step 2. Select a Shell Style

	Designates
00	Wall mount receptacle
40	Wall mount double flange receptacle
01	Line receptacle
02	Box mount receptacle - Consult Amphenol for availability
06	Straight plug
07	Jam nut receptacle
47	Jam nut double flange receptacle
26	Proprietary CLUTCH-LOK high vibration straight plug (service Class RK)
97	Reduced flange jam nut receptacle (not available in composite)
96	Straight plug with integral backshell (not available in composite)

Step 3. Select a Service Class

	Designates
RF	Electroless nickel plated aluminum, optimum EMI shielding effectiveness -65dB @ 10GHz specification min., 48 hour salt spray, 175°C
RW	Corrosion resistant olive drab cadmium plate aluminum, 500 hour extended salt spray, EMI -50dB @ 10GHz specification min., 175°C
RL	Corrosion resistant stainless steel, electro-deposited nickel, 48 hours salt spray, 175°C, non-firewall
RK	Corrosion resistant stainless steel, firewall capability, plus 500 hour salt spray resistance, EMI -45 dB @ 10 GHz specification min., 175°C
DT	Durmalon plated, alternative to cadmium. Corrosion resistant, 500 hour extended salt spray EMI -50dB @ 10GHz specification min. without CR ⁶
DZ	Zinc-Nickel alternative to cadmium. Corrosion resistant, 500 hour salt spray, conductive, -65°C to +175°C



Step 4. Select a Shell Size – Insert Arrangement

Shell Sizes are MIL-DTL-38999, Series III, with the newer High Density insert arrangements chart on page 6-9 and illustrations on page 48.

Shell Size	Insert Arrangement
9-	9
11-	19
13-	32
15-	55
17-	73
19-	88
21-	121
23-	151
25-	187

Step 5. Select a Contact Type

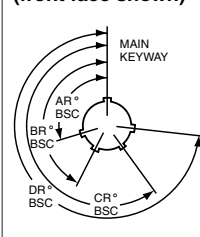
	Designates
P	Pin contacts
S	Socket contacts

Step 6. Select an Alternate Position

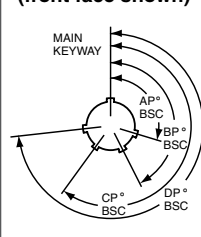
A, B, C, D, E or blank for normal.

Shell Size	Key & keyway arrangement identification letter	AR° or AP° BSC	BR° or BP° BSC	CR° or CP° BSC	DR° or DP° BSC
9	N	105	140	215	265
	A	102	132	248	320
	B	80	118	230	312
	C	35	140	205	275
	D	64	155	234	304
11, 13, and 15	E	91	131	197	240
	N	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C	53	156	220	255
17 and 19	D	119	146	176	298
	E	51	141	184	242
	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
21, 23, and 25	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272
	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272

RECEPTACLE (front face shown)



PLUG (front face shown)



A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The angles for a given connector are the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.

Step 7. Select a PCB Contact Option

Pin Contacts	Pin Contacts with Alignment Disc*	Socket Contacts	Socket Contacts with Alignment Disc**	PCB tail stickout +/- .040 inch
P1*	P1AD	S1	S1AD	.100" nominal
P15*	P15AD	S15	S15AD	.150" nominal
P2	P2AD	S2	S2AD	.200" nominal
P25*	P25AD	S25	S25AD	.250" nominal
P3*	P3AD	S3	S3AD	.300" nominal
P35	P35AD	S35	S35AD	.350" nominal

* Not available in TV40 wall mount double flange receptacle or TV47 jam nut double flange receptacle styles.

** See page 54 for more information on alignment discs for HD38999 connectors.

Note: Standard tail diameter is 0.019 ± 0.01

Stick out is measured from the end of the connector shell to end of the contact

38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear Release Matrix

22992
Class 1

Back-
Shells

Options
Others

38999

Contacts & Tools

Contact Part Numbers:

Size 23 Sockets 10-597330-735 (M39029/17-172)
Size 23 Pins 10-597331-735 (M39029/18-177)
Sealing Plugs 10-405996-222 (MS27488-22-2)

Crimp Barrel Dia.:

(Inches) .034-.036

Crimp Barrel Depth:

(Inches) .151-.155

Tools:

Crimp Tool: Daniels M22520/2-01
Positioner: Daniels M22520/2-16 Socket
Daniels M22520/2-13 Pin
Insertion Tool: Daniels DAK225-22
Removal Tool: Daniels DRK225-22
Insertion/Removal Tool: M81969/16-04 (Plastic)

Note: Wire insulation diameter greater than 0.045 is too large for the extraction tool to work properly. Connector damage is possible.

Technical Data

HD38999 series was designed to meet and/or exceed the specifications of MIL-DTL-38999. The connector series has been tested to all the requirements of 38999 with the use of AS39029 size 23 contacts. Test reports are available upon request. The following is a summary of some of the performance requirements.

EMI Shielding Effectiveness:

Solid metal-to-metal coupling, EMI grounding fingers and conductive finishes have proven to be the ultimate in EMI/EMP shielding effectiveness. The charts on page 24 illustrated shielding effectiveness data which is typical in HD38999 connectors as well as MIL-DTL-38999 connectors.

Electrical:

22 AWG: 5.0 AMPS
24 AWG: 3.0 AMPS
26 AWG: 2.0 AMPS
28 AWG: 1.5 AMPS
Insulation Resistance: 5000 megohms min. @500 VDC 25C
Dielectric Withstanding Voltage: 1000 VRMS @sea level

Environmental:

Operating Temperature: -65°C to +175°C

Salt Spray:
Metallized: Electroless Nickel: 48 hours
Anodic Coating, O. D. Cadmium, Durmalon, Zinc Nickel: 500 hours

Salt Spray Composite: Electroless Nickel: 1000 hours
O. D. Cadmium, Durmalon, Zinc Nickel: 500 hours

Mechanical:

Metallic Shells: Material: Aluminum Alloy, Stainless Steel
Protection: Electroless Nickel, O.D. Cadmium, Durmalon (Nickel PTFE), Zinc Nickel

Composite Shells: Material: Thermoplastic
Protection: Electroless Nickel, O.D. Cadmium, Durmalon (Nickel PTFE), Zinc Nickel

Contacts: Material: Copper Alloy
Protection: Gold over Nickel

Insert Retention to Shell: 100 psi in axial load

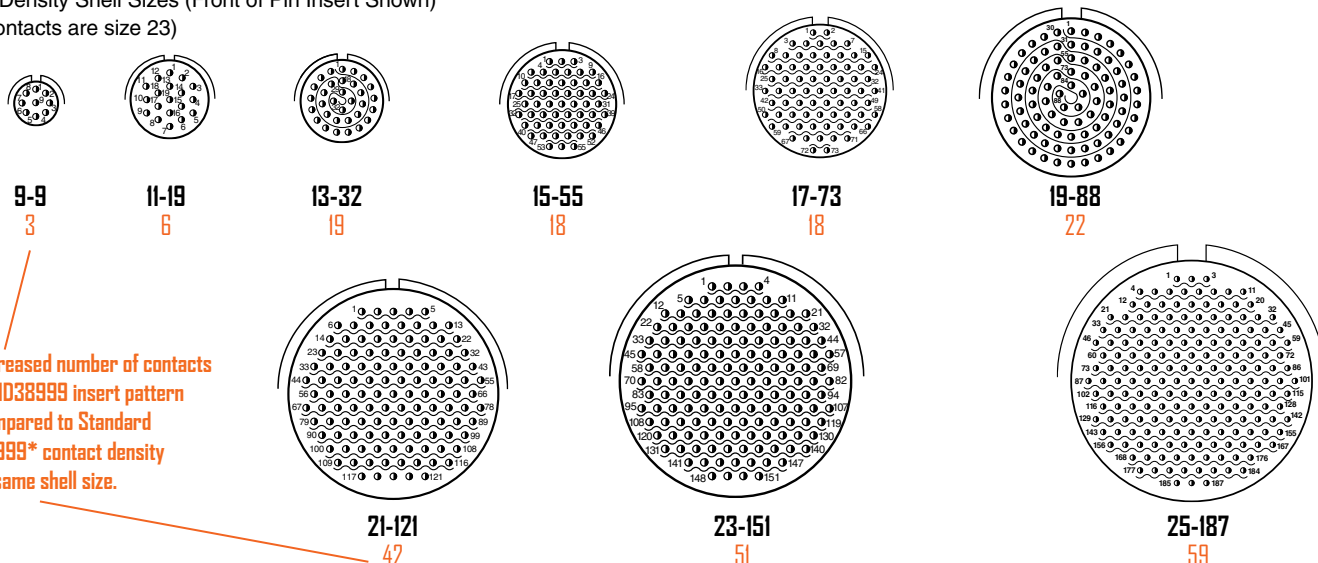
Durability: 500 full mating and unmating cycles

Vibration: 60G sine per MIL-DTL-38999L Para 4.5.23.2.1
5G2 Random per EIA-364-28E, Test condition A
1G2 Random per EIA-364-28E, Test condition I

Shock: Per EIA-364-27B, 300g

HD38999 Insert Availability

High Density Shell Sizes (Front of Pin Insert Shown)
(all contacts are size 23)



38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

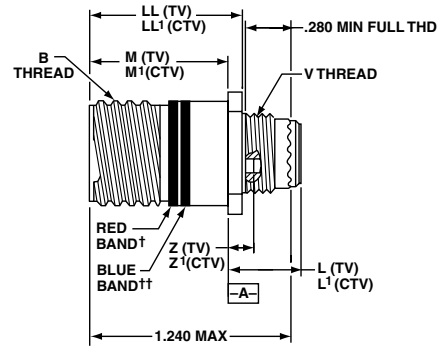
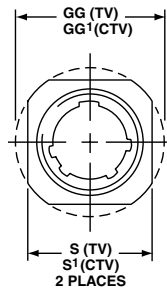
PCB

HDTV01() - Crimp, Metal
HDCTV01() - Crimp, Composite

See how to build a part number on pages 47

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.



Inches

Shell Size	MS Shell Size Code	B Thread 0.1P-0.3L-TS-2A (Plated)	M +.000 - .005 (TV)	M' +.000 - .005 (CTV)	L Max. (TV)	L' Max. (CTV)	S ±.010 (TV)	S' ±.010 (CTV)	Z Max (TV)	Z' Max (CTV)	GG ±.010 (TV)	GG' ±.010 (CTV)	LL +.006 - .000 (TV)	LL' ±.005 (CTV)
9	A	.6250	.820	.773	.469	.520	.675	.635	.153	.198	.812	.699	.905	.908
11	B	.7500	.820	.773	.469	.520	.800	.765	.153	.198	.905	.875	.905	.908
13	C	.8750	.820	.773	.469	.520	.925	.885	.153	.198	1.093	1.007	.905	.908
15	D	1.0000	.820	.773	.469	.520	1.050	1.100	.153	.198	1.219	1.140	.905	.908
17	E	1.1875	.820	.773	.469	.520	1.238	1.197	.153	.198	1.375	1.229	.905	.908
19	F	1.2500	.820	.773	.469	.520	1.300	1.260	.153	.198	1.469	1.380	.905	.908
21	G	1.3750	.790	.741	.500	.552	1.425	1.385	.183	.228	1.625	1.493	.905	.904
23	H	1.5000	.790	.741	.500	.552	1.550	1.510	.183	.228	1.750	1.626	.905	.904
25	J	1.6250	.790	.741	.500	.552	1.675	1.635	.183	.228	1.875	1.777	.905	.904

All dimensions for reference only

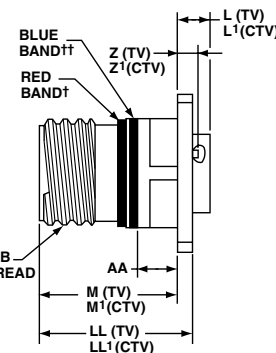
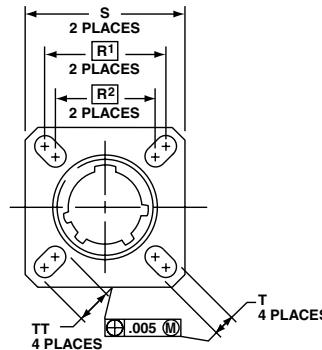
HD38999 High Density Connectors

HDTV02/HDCTV02

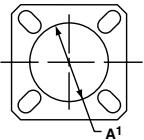
Box Mounting Receptacle

** See availability note below

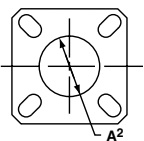
HDTV02() - Crimp, Metal
HDCTV02() - Crimp, Composite



PANEL HOLE DIMENSIONS



BACK PANEL MOUNTING



FRONT PANEL MOUNTING

Inches

See how to build a part number on pages 47

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

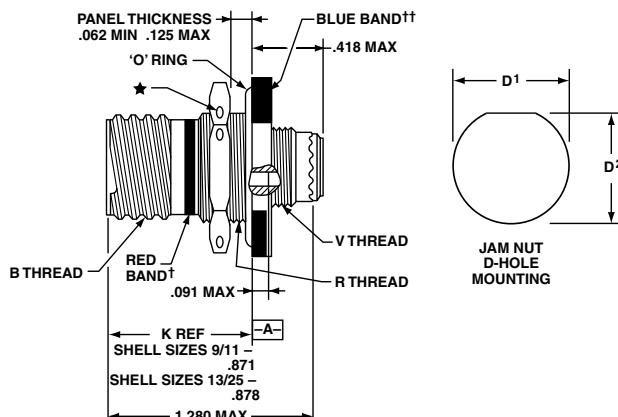
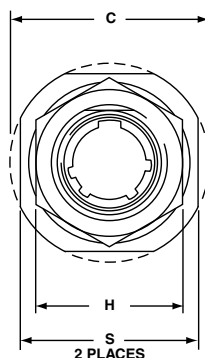
**Consult Amphenol Aerospace for availability for box mount receptacles.

Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	L Max. (TV)	L' Max. (CTV)	M +.000 - .005 (TV)	M' +.000 - .005 (CTV)	R1	R2	S Max. (TV)	T ±.008 (TV)	Z Max. (TV)	Z' Max. (CTV)	A1 Back Panel Mount	A2 Front Panel Mount	AA Max. Panel Thickness	LL +.006 - .000 (TV)	LL1 ±.005 (CTV)	TT ±.008
9	A	.6250	.205	.250	.820	.773	.719	.594	.948	.128	.153	.198	.650	.510	.234	.905	.908	.216
11	B	.7500	.205	.250	.820	.773	.812	.719	1.043	.128	.153	.198	.800	.620	.234	.905	.908	.194
13	C	.8750	.205	.250	.820	.773	.906	.812	1.137	.128	.153	.198	.910	.740	.234	.905	.908	.194
15	D	1.0000	.205	.250	.820	.773	.969	.906	1.232	.128	.153	.198	1.040	.900	.234	.905	.908	.173
17	E	1.1875	.205	.250	.820	.773	1.062	.969	1.323	.128	.153	.198	1.210	1.010	.234	.905	.908	.194
19	F	1.2500	.205	.250	.820	.773	1.156	1.062	1.449	.128	.153	.198	1.280	1.130	.234	.905	.908	.194
21	G	1.3750	.235	.280	.790	.741	1.250	1.156	1.575	.128	.183	.228	1.410	1.250	.204	.905	.904	.194
23	H	1.5000	.235	.280	.790	.741	1.375	1.250	1.701	.154	.183	.228	1.530	1.360	.204	.905	.904	.242
25	J	1.6250	.235	.280	.790	.741	1.500	1.375	1.823	.154	.183	.228	1.660	1.470	.204	.905	.904	.242

All dimensions for reference only

Jam Nut Receptacle

HDTV07() - Crimp, Metal
HDCTV07() - Crimp, Composite



See how to build a part number on pages 47

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

★ .059 dia. min., 3 lockwire holes. Formed lockwire hole design (6 holes) is optional

Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C Max.	D ¹ +.010 - .000	D ² +.000 - .010	H Hex +.017 - .016	S ±.010	V Thread Metric	R Thread (Plated) 9-7543
9	A	.6250	1.199	.693	.657	.875	1.062	M12X1-6g	M17X1-6g
11	B	.7500	1.386	.825	.770	1.000	1.250	M15X1-6g	M20X1-6g
13	C	.8750	1.511	1.010	.955	1.188	1.375	M18X1-6g	M25X1-6g
15	D	1.0000	1.636	1.135	1.085	1.312	1.500	M22X1-6g	M28X1-6g
17	E	1.1875	1.761	1.260	1.210	1.438	1.625	M25X1-6g	M32X1-6g
19	F	1.2500	1.949	1.385	1.335	1.562	1.812	M28X1-6g	M35X1-6g
21	G	1.3750	2.073	1.510	1.460	1.688	1.938	M31X1-6g	M38X1-6g
23	H	1.5000	2.199	1.635	1.585	1.812	2.062	M34X1-6g	M41X1-6g
25	J	1.6250	2.323	1.760	1.710	2.000	2.188	M37X1-6g	M44X1-6g

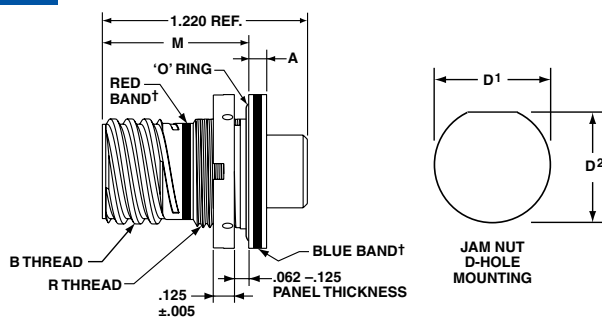
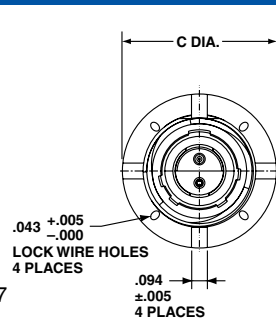
All dimensions for reference only

HD38999 High Density Connectors

HDTV97

Reduced Flange Jam Nut Receptacle

HDTV97() - Crimp, Metal



See how to build a part number on pages 47

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	A +.010 - .005	C Dia. Max.	D ¹ +.010 - .000	D ² +.000 - .010	M	R Thread (Plated) 9-7543
9	A	.6250	.104	.915	.693	.657	.871	M17X1-6g
11	B	.7500	.104	1.042	.825	.770	.871	M20X1-6g
13	C	.8750	.104	1.240	1.010	.955	.878	M25X1-6g
15	D	1.0000	.104	1.357	1.135	1.085	.878	M28X1-6g
17	E	1.1875	.104	1.630	1.260	1.210	.878	M32X1-6g
19	F	1.2500	.135	1.816	1.385	1.335	.878	M35X1-6g
21	G	1.3750	.135	1.942	1.510	1.460	.878	M38X1-6g
23	H	1.5000	.135	2.067	1.635	1.585	.878	M41X1-6g
25	J	1.6250	.135	2.190	1.760	1.710	.878	M44X1-6g

All dimensions for reference only

38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear Release Matrix

22992
Class 1

Back-Shell's

Options
Others

38999

III

HD

Duallok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HDTV47() - Crimp, Metal
HDCTV47() - Crimp, Composite

HIGH
SPEED

Fiber
Optics

Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

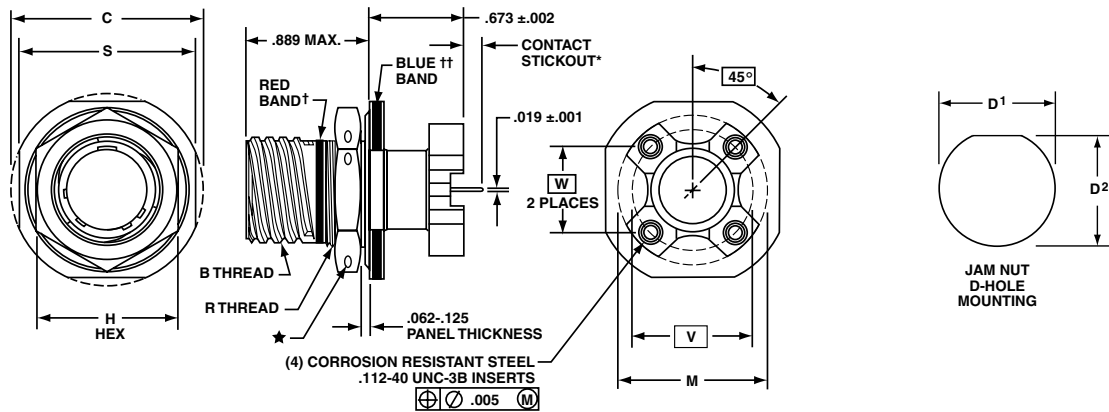
26500
Pyle

5015
Crimp Rear
Release
Matrix

22992
Class L

Back-
Shells

Options
Others



See how to build a part number on pages 47

* Contact stickout dimension: see Step 7 of how to order on page 47.

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

★ .059 dia. min., 3 lockwire holes. Formed lockwire hole design (6 holes) is optional

Inches

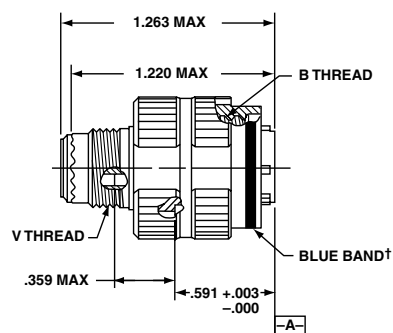
Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C ±.005 (Jam Nut Flange Dia.)	D1 +.010 -.000	D2 +.000 -.010	H Hex +.017 -.016	M Dia. ±.005	R Thread Metric (Plated)	S +.011 -.010	PCB Mounting Dimensions	
										V Dia. (TV) TP	W (CTV) TP
9	A	.6250	1.188	.700	.670	.875	1.016	M17X1-6g0.100R	1.062	.753	.532
11	B	.7500	1.375	.825	.770	1.000	1.148	M20X1-6g0.100R	1.250	.850	.601
13	C	.8750	1.500	1.010	.955	1.188	1.250	M25X1-6g0.100R	1.375	.994	.703
15	D	1.0000	1.625	1.135	1.085	1.312	1.375	M28X1-6g0.100R	1.500	1.119	.791
17	E	1.1875	1.750	1.260	1.210	1.438	1.500	M32X1-6g0.100R	1.625	1.237	.875
19	F	1.2500	1.937	1.385	1.335	1.562	1.625	M35X1-6g0.100R	1.812	1.379	.975
21	G	1.3750	2.062	1.510	1.460	1.688	1.750	M38X1-6g0.100R	1.937	1.489	1.053
23	H	1.5000	2.188	1.635	1.585	1.812	1.875	M41X1-6g0.100R	2.062	1.644	1.145
25	J	1.6250	2.312	1.760	1.710	2.000	2.000	M44X1-6g0.100R	2.188	1.744	1.233

All dimensions for reference only

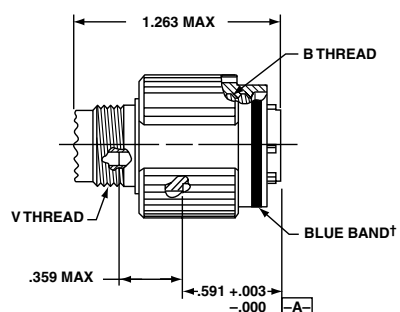
Straight Plug

HDTV06() - Crimp, Metal
HDCTV06() - Crimp, Composite

METAL



COMPOSITE



HD38999 High Density Connectors

HDTV96

Straight Plug with Integral Backshell

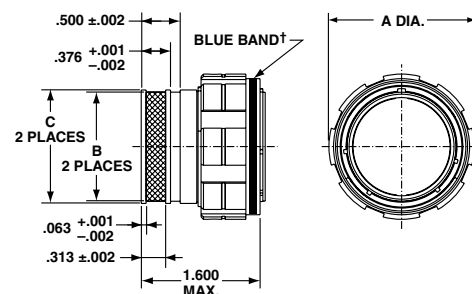
HDTV96() (TV Type) - Crimp, Metal

This MIL-DTL-38999 Series III style connector features an integral backshell design that eliminates the need for costly backshell accessories. The backshell feature is incorporated into the rear of the connector shell, allowing the user to attach the shield of their cable directly to the connector. This provides superior EMI shielding and ease for overmold applications. The straight plug with integral backshell is available in aluminum shells with OD Cad or Electroless Nickel plating.



See how to build a part number on pages 47

† Blue band indicates rear release contact retention system.



Inches

Shell Size	MS Shell Size Code	A Max.	B +.005 / -.000	C +.003 / -.002
9	A	.859	.416	.472
11	B	.969	.524	.580
13	C	1.141	.652	.708
15	D	1.266	.810	.866
17	E	1.391	.928	.984
19	F	1.500	1.046	1.102
21	G	1.625	1.164	1.220
23	H	1.750	1.282	1.338
25	J	1.875	1.400	1.456

38999

III

HD

Dualok

II

I

SJT

Accessories

Aquacon

Herm/Seal

PCB

HIGH SPEED

Fiber Optics

Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear
Release
Matrix

22992
Class I

Back-
Shells

Options
Others

38999

III
HD
Dualok
II
I
SJT
Accessories
Aquacon
Herm/Seal
PCB

HIGH SPEED

Fiber Optics
Contacts
Connectors
Cables

EMI Filter
Transient

26482
Matrix 2

83723 III
Matrix | Pyle

26500
Pyle

5015
Crimp Rear Release Matrix

22992
Class L

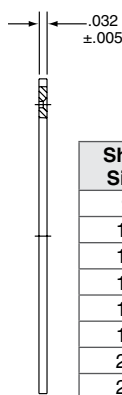
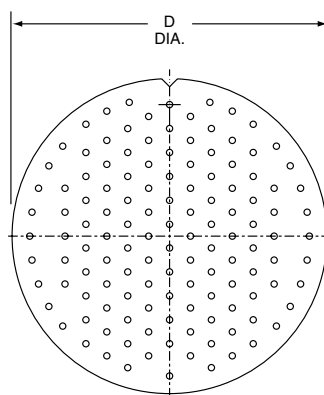
Back-Shells

Options
Others

New Custom Designed HD38999 Connectors - Provide More Interconnect Solutions:

Alignment Disks

Alignment disks keep contacts aligned for easier insertion into circuit boards. These are typically ordered with the connector - see step 7 of How to Order on page 47.

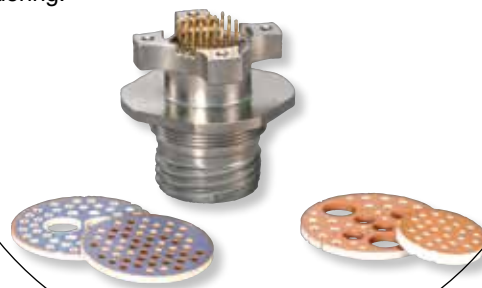


Shell Size	D Dia. ±.010
9	.234
11	.350
13	.500
15	.725
17	.750
19	.850
21	.953
23	1.147
25	1.250

HD38999
High Density

Filtered HD38999 Connectors - for EMI/EMP Protection

High density patterns are available in filter 38999 connectors - consult Amphenol Aerospace for ordering.



HD38999 for Gigabit Ethernet Applications

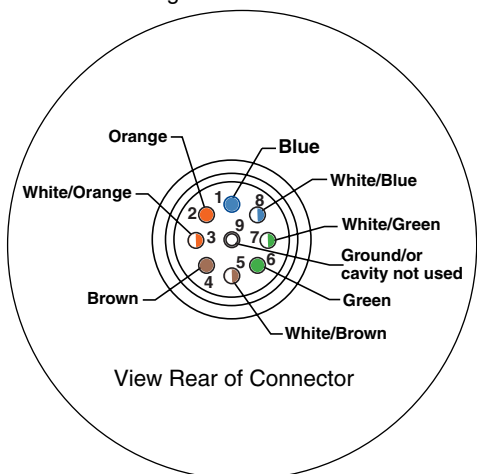
The HD38999 is available for high speed (Gigabit Ethernet) data transmission in the size 9-9 insert pattern.

Data transmission performance of this connector insert:

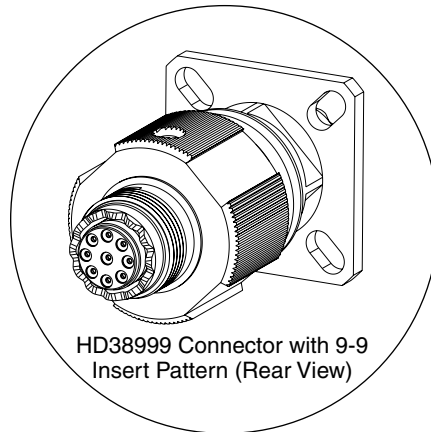
- 10 Base T, 100 Base TX, and 1000 Base T networks using Cat 5e per TIA/EIA568B and Class D per ISO/IEC 11801.

(Test report available - consult Amphenol Aerospace for more information)

Signal-Ground Pin Configuration Wiring Recommendations



View Rear of Connector



HD38999 Connector with 9-9 Insert Pattern (Rear View)